

## ABSTRACT

Title of Document: WHEN GUIDELINES BECOME DEMANDS: HIGHLY RESTRICTIVE STANDARDS PROMOTE SELF-REGULATORY FAILURE.

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Self-regulation is often defined as the process of altering one's thoughts, feelings, or behaviors in order to attain, or maintain, some desired standard (Vohs & Baumeister, 2004). As such, the standards or goals that one commits to influence the likelihood of self-regulatory success or failure (Baumeister, Schmeichel, & Vohs, 2007). Three experiments were conducted to explore whether framing a goal as highly restrictive leads to decrements in self-regulation (hypothesis 1), and whether or not these goals increase ego depletion (hypothesis 2). Study 1 demonstrated that a highly restrictive goal frame caused an increased valuation of goal-damaging temptations. Study 2 replicated and extended Study 1 by demonstrating that highly restrictive goal framing caused greater temptation indulgence as well. Study 3 tested whether or not highly restrictive goals increase levels of ego depletion, a state associated with self-regulatory failure (Schmeichel & Vohs, 2009), but did not support the hypothesis. The role of

psychological reactance (Brehm, 1966; Brehm & Brehm, 1981) in these results, as well as possible future research, is discussed.

WHEN GUIDELINES BECOME DEMANDS:  
HIGHLY RESTRICTIVE STANDARDS PROMOTE SELF-REGULATORY FAILURE

by

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## Dedication

I dedicate this dissertation to my loving parents, Greg and Edie Buzinski, and my wonderful (soon to be) wife, Kym Weed. Mom & Dad, you have bolstered me when I needed support, advised me when I needed guidance, and joked with me when I needed levity. Your example has instilled in me a belief that if I work hard enough, I can accomplish anything. Kym, life is incomplete without you. Your smile, hugs, laugh, wit, intellect, and dancing are just some of the things that make every day of my life complete. Thank you.

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## Table of Contents

Dedication .....	ii
Acknowledgements .....	iii
List of Tables .....	v
List of Figures .....	vi
Chapter 1: Introduction .....	1
<i>Defining Self-Regulation</i> .....	1
<i>The Importance of Self-Regulation</i> .....	4
<i>Influencing Self-Regulation</i> .....	6
<i>Reactance in Self-Regulation</i> .....	10
<i>Reactance in the Limited Resource Model of Self-Regulation</i> .....	15
<i>Theoretical Contributions</i> .....	17
Chapter 2: The Present Research .....	20
<i>Study 1</i> .....	20
<i>Participants</i> .....	20
<i>Procedure and design</i> .....	20
<i>Results</i> .....	23
<i>Discussion</i> .....	25
<i>Study 2</i> .....	26
<i>Participants</i> .....	26
<i>Procedure and design</i> .....	26
<i>Results</i> .....	28
<i>Discussion</i> .....	32
<i>Study 3</i> .....	33
<i>Participants</i> .....	33
<i>Procedure and design</i> .....	34
<i>Results</i> .....	37
<i>Discussion</i> .....	42
Chapter 3: General Discussion .....	45
Appendix A .....	52
Appendix B .....	59
Appendix C .....	60
References .....	64

## List of Tables

<i>Table 1.</i> Summary of Analysis of Covariance (Study 1) .....	24
<i>Table 2.</i> Summary of Analysis of Variance: Behavior (Study 2) .....	29
<i>Table 3.</i> Summary of Analysis of Variance: Attitudes (Study 2) .....	31



## List of Figures

<i>Figure 1.</i> The effect of goal domain and goal restrictiveness on self-regulation (Study 1).....	25
<i>Figure 2.</i> The effect of goal domain and goal restrictiveness on self-regulation (Study 2).....	30
<i>Figure 3.</i> The effect of goal domain and goal restrictiveness on attitudes toward temptations (Study 2).....	31
<i>Figure 4.</i> The effect of temptation presence and goal restrictiveness on cold pressor task persistence, $N = 98$ (Study 3).....	41
<i>Figure 5.</i> The effect of temptation presence and goal restrictiveness on cold pressor task persistence, $N = 76$ (Study 3).....	42

# Chapter 1: Introduction

## **Project Overview**

Self-regulation involves conforming one's thoughts, feelings, or behaviors to attain, or maintain, some desired standard (Schmeichel, Harmon-Jones, & Harmon-Jones, 2010). I have observed that these standards are often defined in terms of very restrictive exhortations (e.g., I must do this, you must not do that). The very nature of these exhortations suggests that psychological reactance, the motivation to restore a threatened free behavior (Brehm, 1966), may play a role in some instances of self-regulatory failure. The desire to maintain a sense of personal freedom may thus counteract one's resolve to maintain the imposed restrictions. The current work aims first to provide a review of relevant research and then to demonstrate how the process of reactance may promote self-regulatory failure.

## **Defining Self-Regulation**

In the late 1960s Walter Mischel began a series of landmark studies on the delay of gratification (see Mischel & Ayduk, 2004 for a review). Mischel made a simple proposition to his four-year-old participants: "have one marshmallow now or wait until I return and you can have two marshmallows." As one would expect, some children waited for the experimenter to return, many did not. Perhaps more intriguing than his initial findings, however, is what Mischel discovered in follow-up studies conducted years later. Mischel & colleagues (Mischel, Shoda, & Peake, 1988; Mischel, Shoda, & Rodriguez, 1989) found that children who were able to delay gratification were rated as more rational and socially competent, scored higher on the Scholastic Aptitude Test (S.A.T.), and were better able to cope with frustration and stress as adults. Mischel &

Ayduk (2004) proposed that a common mechanism, self-regulation, underlies the relationship between delay of gratification and future success.

Self-regulation refers to the self altering its own responses or inner states (Vohs & Baumeister, 2004). This typically involves overriding one initial response or behavior and replacing it with a more desirable but less dominant response (Baumeister, et al., 2007). The process of self-regulation can be broken down into three components: commitment to standards, the monitoring of relevant behaviors, and the capacity for inhibiting a response and altering behavior (Baumeister et al., 2007).

Standards are concepts of possible states (Baumeister et al., 2007). They function as guides for self-regulation, and may be goals, values, expectations, laws, ideals, social norms, religious edicts, or other rules and regulations (Gailliot, et al., 2007). Their guiding properties make setting standards the most important act of “willing” in many models of self-regulation. In essence, without a standard, self-regulation could not exist.

One must have a desire or proclivity toward a standard before it is adopted, otherwise the self will not regulate the necessary thoughts, feelings, and/or behaviors to attain it. The strength of one’s motivation to attain a standard will influence his or her intensity, persistence, and duration of pursuit (Fishbach, Friedman, & Kruglanski, 2003). Motivation is not a constant state (Bargh, 1990), and it can be influenced from moment to moment by a variety of factors, including the subjective value and expectation of attaining a standard (Atkinson, 1964). The standards people commit to, then, have important implications for self-regulatory success or failure.

After committing to standards, one must begin to monitor relevant thoughts, emotions, and behaviors in order to successfully self-regulate. In fact, improving one’s

monitoring will significantly improve one's overall self-regulation (Baumeister, et al., 2007). Monitoring consists of comparing the self's current status against relevant standards. When there is a discrepancy between the current self and ideal standards, self-regulation is necessary to diminish the discrepancy (Higgins, 1987).

Proper monitoring also aids self-regulation by identifying when there are conflicts between the pursuit of a standard and any counterproductive behavioral plan (Metcalfe & Mischel, 1999). A counterproductive behavioral plan may involve not advancing the self toward a desired standard through inaction, ineffective action, or alternative, counterproductive actions. When one does attain a standard, self-regulation may still be required in order to maintain that state. In either instance, monitoring would involve identifying threats to the attainment or maintenance of a relevant standard. For instance, if the self is not trying hard enough to reach a goal, monitoring will consist of identifying the lack of effort, and subsequent self-regulatory efforts will be aimed at reducing the discrepancy, most likely by trying harder (Schmeichel & Zell, 2007).

Ultimately one must have the capacity to override counterproductive responses and to alter behavior in order to self-regulate successfully (Baumeister et al., 2007). Accumulating evidence suggests that the capacity to self-regulate depends on a limited resource or ability (e.g. Gailliot, et al., 2007; Vohs, Baumeister, & Ciarocco, 2005; Clarkson, Hirt, Jia, & Alexander, 2010). Specifically, controlled, explicit acts of self-regulation deplete a common resource which decreases the likelihood of subsequent regulation (e.g., Muraven & Baumeister, 2000). Baumeister et al. (2007) link this limited resource to the self's general executive function, the part of the self that "makes decisions, initiates and maintains action, and in other ways exerts control over both self

and environment” (Baumeister, 1998, p. 712). Baumeister & colleagues (1994; 1997; 2004; 2007) have labeled the depletion of one’s limited self-control resources as “ego depletion.”

Because self-regulation is a part of the self’s executive function, only controlled acts of self-regulation fatigue one’s executive resources, resulting in ego depletion. Relatively automatic (i.e., frequently and consistently practiced; Shiffrin & Schneider, 1977; Bargh, 1990) self-regulation should not deplete one’s capacity to self-regulate because automatic processes are not dependent on the executive function.

### **The Importance of Self-Regulation**

Inasmuch as self-regulation increases the likelihood of attaining desired goals and standards, it is a crucially important process that spans many areas of human life. Self-regulation helps us to navigate our environment, past salient temptations and toward the attainment of desired outcomes, such as success, healthy living, and emotional stability (Gailliot, et al., 2007). Without adequate self-control people may experience emotional instability, engage in impulsive behavior, or make minimal progress toward important personal goals (Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008).

A great deal of evidence has linked strong self-regulation with a range of desirable outcomes. For instance, one goal people often aspire to in their childhood is to succeed in school. In a longitudinal study of eighth grade students, Duckworth & Seligman (2005) found that self, parent, and teacher-reported student self-control, measured in the fall, significantly predicted final grades, school attendance, standardized test scores, and admittance to more competitive high-school programs in the spring. Moreover, self-control accounted for more than twice the variance in relevant academic

achievement measures than did IQ score (Duckworth & Seligman, 2005). Self-regulation has also been associated with prosocial behaviors. DeWall, Baumeister, Gailliot, & Maner (2008) found that when individuals had requisite self-regulatory resources they were significantly more likely to donate food or money. When participants were ego depleted due to a preliminary self-control task, however, they reported significantly less willingness to help the victim of a recent tragedy. Another commonly held goal is to be moral. Baumeister & Exline (1999) have argued that morality depends on overcoming selfish or antisocial impulses for the good of a collective. Self-regulation helps to inhibit and override antisocial actions that may interfere with acting in a moral manner (Baumeister & Exline, 1999). In a similar fashion, self-regulation may also help to improve interpersonal relationships. Rawn & Vohs (2006) found support for this idea, such that the ability to control counterproductive impulses strongly and positively predicts one's ability to convey himself as a good relationship partner, as well as to behave in the manner of a good relationship partner. Thus, good self-regulation is positively associated with personal, interpersonal, and societal outcomes.

There is also ample evidence linking poor self-regulation with a variety of detrimental outcomes, including what are typically considered "problem" behaviors (Baumeister et al., 2007). One correlate of poor self-regulation is the inability to persist on tasks that require effort. Schmeichel & Zell (2007) found that in a task which required participants to refrain from blinking, individuals who scored lower on the Self-Control Scale (Tangney, Baumeister, & Boone, 2004) blinked significantly more than those who reported greater self-control. Similarly, in a cold pressor task (holding one's hand in a tub of ice water), the authors found that poor self-regulating individuals persisted for a

significantly shorter period of time than those with better dispositional self-regulation. Task persistence facilitates the attainment of one's desired standards (Schmeichel & Zell, 2007).

Poor self-regulation may also negatively influence one's emotional wellbeing. For instance, when one is faced with a self-control dilemma and fails, he/she will often experience a distressing, negative emotional state (Higgins, 1987). This negative state may begin upon temptation indulgence and last until the negative emotions can be "purged" by future actions that are more in line with one's standards (Ramanathan & Williams, 2007). Ineffectual self-regulation may have negative consequences on a societal level as well. Muraven, Collins, & Nienhaus (2002) found that when self-control resources were low, male social drinkers consumed significantly more alcohol and achieved a higher blood alcohol level, even though they were expecting to perform a driving test afterwards. Poor self-regulation contributed to risky decision making, and potentially extreme problematic behavior, insofar as drinking and driving endangers not only the individual driving but other drivers as well. Inadequate self-control, then, is associated with impaired progress toward standards and many detrimental outcomes.

### **Influencing Self-Regulation**

To date several facilitating and inhibiting factors have been found to influence self-regulation. Much of the recent research in self-regulation has attempted to identify factors that counteract ego depletion. This research paradigm initially depletes an individual's regulatory resources, and then introduces an intervention to facilitate subsequent self-control. One factor that has been found to counteract initial resource depletion is self-affirmation. Schmeichel & Vohs (2009) found that initial self-regulatory

efforts resulted in ego depletion, and in a subsequent reduction of pain tolerance, less persistence on a difficult task, and abridged delay of gratification. These effects were attenuated, however, when participants were instructed to self-affirm (e.g., think of and list their personal morals and core values) after the initial task. Indeed, self-affirming participants showed no negative effects compared to a non-depleted, control group. Ostensibly, self-affirmation facilitates self-regulation by promoting abstract or high level mental construal (Schmeichel & Vohs, 2009). High level construal refers to a focus on the global, superordinate, or abstract features of an event, whereas low level construal is a focus on the local, subordinate, or concrete features of an event (Trope & Liberman, 2003). High level mental construal has been linked to good self-control (Fujita, Trope, Liberman, & Levin-Sagi, 2006) because it focuses individuals on their superordinate goals rather than on transient temptations. According to Vohs & Schmeichel (2003) individuals with depleted self-regulatory resources operate under lower levels of construal. Thus, by promoting high levels of mental construal, self-affirmation promotes successful self-regulation.

A very interesting set of studies has also identified blood glucose as a possible moderator of resource depletion. An initial study, conducted by Benton, Owens, & Parker (1994) linked blood glucose to performance on the Stroop color-word interference task. Difficult trials of this task require self-regulation because participants must inhibit the habitual response to read a word's text, and rather say the color the word is printed in. Easy trials require no such self-regulation. Benton et al. (1994) found low blood glucose levels resulted in impaired performance on difficult (i.e. regulation necessary), but not easy, trials of the Stroop task. Furthermore, across nine studies, Gailliot et al. (2007)



demonstrated that effortful self-regulation reduced levels of glucose in the bloodstream, that low blood glucose levels predicted self-regulatory failure, and the manipulation of glucose (i.e. the administration of a sugary drink), but not sucralose (an artificial sweetener) facilitated subsequent self-regulation. Glucose appears to restore the self's fatigued resources by providing energy that an individual can call upon. Whereas glucose does seem to combat ego depletion, the underlying biological mechanisms are still not entirely understood (Gailliot et al., 2007).

Whereas self-affirmation or glucose may facilitate self-regulation after initial resource depletion, other research has shown that one may be able to improve self-regulatory capacity permanently with consistent practice. Muraven, Baumeister, & Tice (1999) found that compared to a non-practice control group a group given two weeks of consistent practice (e.g. trying to improve one's posture by sitting or standing up straight), improved on laboratory tests of self-regulation after initial depletion. The authors believe that practicing self-regulation improves domain-general executive resources (e.g., the capacity to self-regulate), which generalize to success on other, unrelated tasks (Muraven et al., 1999). Moreover, Fishbach, et al. (2003) found that with repeated successes at self-regulation, a mental association forms between a higher-importance goal and temptations, such that the stimuli associated with temptations cause the higher-importance goal to become more cognitively accessible. With relevant, higher-importance goals activated, a person is much less likely to indulge in the temptation (Fishbach et al., 2003). According to Bronwell, Marlatt, Lichtenstein, & Wilson (1986) recognizing temptations and the standards that will suffer if one engages

in them is an important step in self-regulation. To improve self-regulation, then, one good idea is simply to put effort into practicing it as often as one can.

Similarly, factors have been identified that retard self-regulation. Engaging in effortful decision-making, such as choosing between varieties of consumer goods, is one such factor. Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice (2008) found that a decision-making group exerted significantly less self-control (e.g. procrastinated more, had reduced persistence in the face of failure) on ensuing tasks than did a group who merely deliberated about the same options without making a decision. The resultant ego depletion reduced participant capacity to override counterproductive responses and alter behavior after initial decision making.

Self-regulation often involves breaking abstract standards down into concrete, attainable, sub-goals (Carver & Scheier, 1998) and monitoring progress as those sub-goals are attained. The successful attainment of a sub-goal, though, can either increase or decrease the pursuit of other sub-goals that are linked to the same standard (Fishbach, Dhar, & Zhang, 2006). Self-regulation is hindered when individuals view the attainment of a sub-goal as an end state, and it is facilitated when sub-goal attainment is perceived as a sign of commitment to the overarching standard. When individuals consider the attainment of a sub-goal as an end-state, they will experience the consequences of goal attainment, one of which is the motivation to move temporarily away from the pursuit of a goal (Dhar & Simonson, 1999). Successful self-regulation involves remaining cognizant of over-arching standards, even as we pursue concrete sub-goals.

As discussed earlier, the standards one adopts can influence whether regulatory efforts succeed. Van Hook & Higgins (1988) found that people holding discrepant (i.e.,

conflicting, discordant) goals experienced significantly more frequent feelings of indecisiveness and distractibility. Similarly, Baumeister et al. (1994) found that conflicting standards are one of the most important sources of “self-regulatory breakdown.”

These findings suggest that, in addition to the standards that one commits to (e.g., to be fit and healthy, to be moral), the way standards are framed has important implications for self-regulation. I have observed that standards are often framed in terms of strict requirements (e.g., I must do this, you must not do that), which include multiple prohibitions and demands. The very nature of these exhortations suggests that they may arouse psychological reactance, and that reactance may lead to self-regulatory failure.

### **Reactance in Self-Regulation**

According to reactance theory, if individuals feel that any of their free behaviors is threatened with elimination, a motivational state will be aroused directed towards the restoration of the freedom to engage in the threatened behavior (Miron & Brehm, 2006; Brehm, 1966). This motivational state is referred to as reactance (Brehm, 1966). Brehm & Brehm (1981) outlined four general principles of reactance theory. The first stated that reactance will only be aroused to the extent that people believe they have the freedom to engage in or have control over a behavior. The second principle states that the magnitude of reactance experienced (i.e., the strength of the motivational force to restore a freedom) increases as the subjective attractiveness of a threatened freedom increases. The third principle states that the magnitude of reactance experienced is a function of the number & proportion of freedoms threatened. The fourth principle states that freedoms can be threatened by implication. Specifically, individuals need only to infer that their freedoms

may be threatened for reactance to be aroused. Self-regulation has the potential to produce reactance because the very nature of self-regulation involves placing a requirement on a person that limits freedom.

There are two consequences of arousing reactance, which may occur individually or in concert. Individuals may directly attempt to restore their freedom and thus reduce reactance by engaging in the threatened behavior. When a freedom is threatened in a manner that makes engaging in the behavior difficult or costly, however, subjective effects are more likely to occur (Brehm & Brehm, 1981). The subjective effects of reactance include increasing the perceived desirability of performing the threatened behavior, increasing the attractiveness of a threatened option, and/or decreasing the attractiveness of an imposed alternative (Miron & Brehm, 2006). It is of theoretical interest to examine both direct restorative attempts and the subjective attitudinal consequences of reactance in a self-regulation paradigm. If reactance is activated by a person's standard, such as a highly restrictive goal, the direct restorative attempt would involve indulging in a temptation (a self-control failure) and the subjective attitudinal consequence would involve the increased valuation of temptations and/or the decreased valuation of the goal (antecedents of self-control failure; Fishbach, 2009).

There is evidence that suggests the experience of reactance may be involved in some instances of self-regulatory failure, but the link has been largely unexplored. For example, warnings of potential health problems often lead to dismissive or defensive reactions (Lieberman & Chaiken, 1992). From a self-regulatory perspective the productive response to a health threat is to change one's behavior to prevent any potential harm. The authors did not explore the possibility, but one explanation for this self-

regulatory failure is that a threat to one's health may imply the need to give up previously held, free behaviors. Consistent with Brehm & Brehm's (1981) theory, the implication that one will have to give up freedoms is enough to arouse reactance, especially when the threatened behaviors are subjectively attractive. Once reactance is aroused, a person will work to maintain or reassert freedoms.

Another example comes from research on threat and persuasion. In an experiment by Worchel & Brehm (1971), participants were told that they would work on a task with two other participants (both were actually experimental confederates). They were also told that the group would have the option of choosing one out of two possible tasks to work on. All participants then heard one of the confederates make a freedom-threatening statement (i.e., "Well, I think it's obvious that we'll work on task A"), which activated reactance. The statement was either followed by a freedom restoring response from the other confederate (i.e., "Wait just a minute. I really haven't made up my mind about the two tasks yet"), or it was followed by no response. Whereas participants in the former condition had their freedom restored and reactance resolved, participants in the latter condition continued to experience reactance.

When the participants were subsequently asked by the experimenter which task they preferred to work on, 83% in the freedom-restored condition preferred the *case advocated* by the first confederate (Case A), whereas 83% of participants in the freedom-not-restored condition preferred *the other case* (Case B). When participants perceived the freedom to agree or disagree, the first confederate's statement generated agreement. When participants perceived a threat to their freedom to agree or disagree, however, the first confederate's statement generated reactance and disagreement.

This finding provides support for the notion that a self-regulatory standard can either promote self-regulatory success or failure, depending on whether or not individuals perceive it as impinging on their freedom, just as the same persuasive statement above was able to generate both agreement and disagreement across conditions. Thus, if one's standard is perceived as freedom threatening, it should activate reactance and lead to self-regulatory failure. If it is not perceived as threatening, it should guide one's efforts and lead to self-regulatory success. This analysis also implies that the same standard (e.g., to eat well) can intermittently facilitate and inhibit self-regulation, and one reason may be an individual's fluctuating perception of how freedom-threatening it is.

Commodity theory (Brock, 1968) posits that any commodity (e.g., a message, experiences, skills, objects) will be valued to the extent that it is unavailable. According to Brock (1968), factors such as limits on the supply of a commodity (scarcity), or costs associated with attaining or keeping a commodity produce the perception of unavailability. This perception increases the perceived value of the unavailable item or items. Inasmuch as a highly restrictive self-regulatory goal places severe limitations on the availability of temptations, or a heightened cost of attaining them, according to commodity theory, the temptations should increase in perceived value.

The three aforementioned findings lend support to the idea that reactance may be involved in at least some cases of self-regulatory failure. In each case, some measure of threat or restriction was implicated in a situation that resulted in behavior counterproductive to self-regulatory success.

To the best of my knowledge, no one has ever systematically investigated the consequences of reactance when it is activated as an individual is simultaneously

pursuing a conflicting goal. This unexplored phenomenon is important because when reactance is activated by a highly restrictive goal, the motivation to restore one's freedom conflicts with the motivation one has to attain the goal. This type of "goal conflict" is a factor in self-regulatory failure (Gollwitzer & Moskowitz, 1996). An aim of the current investigation is to determine when a person will abandon goal pursuit (and thus cease self-regulating) in favor of restoring a sense of personal freedom.

It is likely that the answer to the foregoing question depends on several factors, among them the magnitude of reactance experienced and an individual's commitment to the conflicting goal. It has been demonstrated that extreme goal commitment causes individuals to maintain goal pursuit by suppressing other motivations (Fishbach & Dhar, 2005). Therefore it is expected that when goal commitment is extremely high, individuals will suppress their desire to restore a sense of personal freedom, and reactance will be less likely to lead to regulatory failure. When goal commitment is not so extreme, however, and the value of attaining a highly restrictive goal is relatively close to the value of the freedoms that it restricts (as is often the case when a person needs to self-regulate), there is evidence which suggests that reactance motivation is likely to exert a great enough influence to result in self-regulatory failure.

For example, during a self-control dilemma a person must choose between pursuing a goal and indulging in a temptation (Metcalf & Mischel, 1999). Self-control is required to maintain goal pursuit because temptations are by definition desirable behaviors that people are motivated to engage in; such as indulging in a behavior that is detrimental to a goal, or discontinuing work toward a goal (Leander, Shah, & Chartrand, 2009). In a self-control dilemma, if one's goal is highly restrictive and so threatens his or

her freedom in a manner that activates reactance, self-control would be necessary to overcome both the motivation to indulge in a temptation and the motivation to restore one's threatened freedom.

As a result, indulging in the temptation allows a person to attain two goals: to restore a sense of personal freedom and to engage an appealing behavior. Chun & Kruglanski's (2005) research on the "multifinality" effect has demonstrated that people have a preference for choice options that allow them to attain multiple goals simultaneously. A single choice option or "means," which allows one to attain multiple goals is more desirable and thus preferential to options that attain only a single goal (Chun & Kruglanski, 2005). Simonson's (1989) research on the compromise effect demonstrated a similar principle, that people show a general preference for choice alternatives which allow them to partially attain several goals rather than completely attain a single goal, at the expense of other goals. Finally, Brehm & Brehm (1981) theorize that reactance aroused in regards to a threatened behavior will add to the total motivation to attain that choice alternative.

### **Reactance in the Limited Resource Model of Self-Regulation**

I have argued that highly restrictive self-regulatory goals will activate reactance, thereby motivating individuals to restore their freedom by sabotaging those goals. An area of exploration for the current investigation will be determining the underlying causes of the proposed "goal restrictiveness" effect. Specifically, whether or not highly restrictive goals fatigue the limited resources individuals possess to self-regulate.

When highly restrictive goal demands activate reactance, an individual will experience a conflict between several opposing forces. The motivation to maintain goal



pursuit will come into conflict with the motivation to indulge in an attractive behavior (the temptation) *and* the motivation to restore one's personal freedom. As discussed previously, such a situation would increase the total motivational force to indulge in the temptation, compared to a situation in which the goal was less restrictive. Consequently, greater amounts of self-control would be necessary to inhibit an indulgence in the temptation, and self-control resources would be depleted at a much greater pace. Would an extended conflict between these forces fatigue the self's executive function, and in so doing drain self-control resources? The answer to this question will help to inform the limited resource model (e.g., Baumeister et al., 2007) and potentially illuminate a cognitive mechanism underlying goal restriction.

There have been findings in social and cognitive psychology which suggest that an extended conflict, due to the perception of highly restrictive goal demands, can be resource depleting. A study by Schwarz (1980) examined the effects of experiencing reactance over a period of time without the ability to restore one's freedom. When participants' freedom was threatened and then restored after a very brief time delay, their evaluation of a threatened behavioral option was no more positive than a control group's. When freedom was threatened, and then restored after a longer time delay, participants reported a significantly more positive evaluation of the threatened freedom. The effect of the freedom threatening statement increased over time, ostensibly because as one experiences reactance, cognitive processes are engaged that bolster the value of the threatened freedom. For instance, one might enumerate its positive features or increase its perceived functionality (Schwarz, 1980). If a highly restrictive goal activated reactance, over time such cognitive processes might bolster the value of a temptation,

which would require greater self-control in order to inhibit (Baumeister et al., 2007). As such, highly restrictive goals should be more resource depleting than less restrictive goals.

Additional support comes from research on cognitive control disorders. According to Novick, Kan, Trueswell, & Thompson-Schill (2009), situations in which one must resolve a cognitive conflict require executive control. Conflict arises from competition among multiple, incompatible cognitive representations when none are substantially more compelling than the others (Novick et al., 2009). For instance, when the motivation to attain a goal is in conflict with the motivation to reassert one's freedom, executive control would be necessary to inhibit the latter in order to successfully achieve the former. As discussed previously, when the executive function is fatigued, self-control resources are diminished (Vohs et al., 2008).

Taken together, this analysis suggests that highly restrictive goals could potentially fatigue the self's executive function, and result in subsequently impaired self-control. The final study in the current investigation will examine this possibility.

### **Theoretical Contributions**

Based on the foregoing analysis, there are three potential theoretical contributions of the current work. The first is that highly restrictive standards activate reactance, which results in a greater likelihood of self-regulatory failure. The second is an addition to the reactance literature: reactance can influence behavior as an individual is actively pursuing a conflicting goal. The third is that highly restrictive goals cause ego depletion, informing the limited resource model of self-regulation.

### **Overview of Studies**

This investigation has two main hypotheses:

Highly restrictive standards are more detrimental to self-regulation than less restrictive standards.

Highly restrictive standards require greater self-control than less restrictive standards, thereby causing greater ego depletion.

Restrictive standards threaten the freedom to engage in certain behaviors, and these threats to freedom create reactance: the more restrictive the standards, the greater the reactance. As discussed, the consequence of reactance can be either the direct engagement in a threatened behavior or the subjective changing of attitudes about a threatened option and/or its imposed alternative (Brehm & Brehm, 1981). The proposed research investigates whether these reactance effects will be detrimental to self-regulation when a self-regulatory goal is active. For example, a highly restrictive goal may be the goal to eat *only* health food, which threatens one's freedom to eat junk food. If this highly restrictive goal increases the subjective attractiveness of the junk food, and makes one more likely to eat junk food in the future, whereas a less restrictive goal does not, then the way this goal is framed is detrimental to self-regulation. The current investigation studied the impact of goal restrictiveness on both attitudes (Study 1) and behavior (Study 2).

The following studies were designed to examine my research hypotheses. Study 1 assessed the evaluation of temptation-related food items after participants were presented with either a highly or less restrictive health/fitness or non-health/fitness goal. Study 1 sought to examine the subjective attitudinal consequences of reactance. Study 2 investigated yielding to temptations after participants were presented with either a highly

or less restrictive health/fitness or non-health/fitness goal. Study 2 examined the direct behavioral consequences of reactance, and provided a conceptual replication of Study 1. Study 3 explored whether highly restrictive goals, by activating reactance and thereby enhancing the desirability of temptations, are more ego depleting than less restrictive goals. As such, study 3 sought to determine whether highly restrictive goals are self-control resource dependent.

## Chapter 2: The Present Research

### Study 1

The purpose of Study 1 was to investigate an implication of my first research hypothesis: whether highly restrictive goals result in an attitude change consistent with self-regulatory failure, compared to less restrictive goals. Study 1 manipulated a self-regulatory goal, as well as how restrictively the goal was framed, and measured attitudes toward temptations. The goal was manipulated by priming participants with a health/fitness related (vs. a non-health/fitness) advertisement. Goal restriction was manipulated with the introduction of a freedom threatening (vs. neutral) message.

### Method

**Participants.** Sixty-three undergraduate (50 female, 13 male) psychology students from the University of Maryland participated in exchange for course credit. The age of participants ranged from 18 to 26 years, with a mean age of 19.1 years.

**Procedure.** Participants were told that the study was investigating how different personality variables influence the efficacy of consumer advertisements. After describing the study, participants were told that the experimenter had to control for demographic variables, so they were asked to complete a demographics questionnaire (for all Study 1 material, see Appendix A). Participants were then informed that they would receive three advertisements to view sequentially, each for twenty seconds. After twenty seconds, each advertisement was taken away and placed out of sight. In order to ensure that participants would thoroughly scrutinize each advertisement, they were also told that they would subsequently answer questions about each ad. The first two advertisements were

identical for all participants, and were included to bolster the cover story of the experiment. The presentation of the first two advertisements was counterbalanced. The final advertisement served to manipulate goal domain.

**Goal Domain.** Bargh and colleagues (1994; 2001) have demonstrated that primed goals behave identically to explicitly activated goals, and therefore a modified version of their goal priming procedure was used to manipulate goal domain. Specifically, the third advertisement supraliminally primed either a health/fitness goal or a goal unrelated to health/fitness. Participants were randomly assigned to receive either an advertisement for a health/fitness related product (i.e., a fictitious health bar) or a product unrelated to health/fitness (i.e., a bath tub faucet). The former advertisement was intended to activate participants' health/fitness goals, whereas the latter was unrelated to health/fitness concerns and thus served as a control condition. Participants responded to the item, "how committed are you to a health/fitness goal?" in an online mass testing questionnaire before the experiment in order to control for participants' goal commitment.

**Goal Restriction.** Goal restriction was manipulated via the introduction of a freedom threatening or non-threatening message. Consistent with the methodology of Regan & Brehm (1972), a freedom threatening message (i.e., "You have no choice...") was delivered to half of the participants as part of the final advertisement. This message was intended to create the perception of a highly restrictive goal (i.e., dieters are only allowed to eat healthy food), and activate participant reactance. The third advertisement for the other half of the participants contained a non-threatening message (i.e., "It is your choice..."), and served as a control condition.

**Self-Regulatory Attitudes.** The dependent measure was described as a “consumer evaluative summary” report. Participants were told that all persons have different “CES portfolios” and that this was a personality variable that the experimenter needed to control for. The measure consisted of a list of twelve consumer items. Participants indicated how desirable they found each item, and how much they wanted to own, eat, or wear the item. Of the 24 total questions (two questions per consumer item), only four were of theoretical interest. The 20 additional items were included to bolster the cover story and to disguise the intention of the questionnaire.

The two items of interest were, “ice cream” and “salad.” These items were selected for two theoretical reasons: first, the subjective effects of reactance result in a more positive evaluation of restricted behavior (ice cream) as well as a more negative evaluation of imposed alternatives (salad) according to Brehm & Brehm (1981). Second, self-regulation involves simultaneously controlling one’s attitudes towards the means to goals (eating salad is a means to attain the goal of being healthy), and towards temptations (eating ice cream is detrimental to the goal of being healthy) as well (Schmeichel, et al., 2010). Taken together, these items serve to operationalize the attitudinal antecedents of self-regulatory engagement (Fishbach, 2009). Participants responded on a Likert scale, with options ranging from 1 (not desirable/do not want) to 7 (very desirable/very much want). After the two “salad” items were reverse scored, the mean of all four items served as the operationalization of self-regulatory attitudes (Cronbach’s  $\alpha = .65$ ), with higher scores indicating attitudes consistent with greater self-regulatory failure (Fishbach, 2009; Leander et al., 2009). After the dependent measure was completed, participants were given an independent variable check,

described as an “advertisement reaction report,” ostensibly the focus of the experiment. Finally participants were checked for suspicion, fully debriefed, and thanked for their participation.

## **Results**

A preliminary analysis showed that there were no effects due to gender, so it is excluded from all further analyses.

**Independent Variable Check.** To check participant awareness of the final advertisement, which contained the experimental manipulations, responses to the item, “The third advertisement was for a bathroom faucet” were analyzed using a 2 (Goal Domain: Health/Fitness vs. Non-Health/Fitness) x 2 (Goal Restriction: High vs. Low) between-subjects ANOVA. This analysis revealed a significant main effect for goal condition, such that participants in the health/fitness goal condition reported significantly greater disagreement ( $M = 1.00$ ,  $SE = .45$ ) than did participants in the non-health/fitness goal condition ( $M = 6.48$ ,  $SE = .46$ ),  $F(1, 59) = 72.44$ ,  $p < .001$ ,  $\eta_p^2 = .55$ . There were no other significant effects.

**Self-Regulatory Attitudes.** In a pilot test of self-regulatory attitudes ( $N = 20$ ), 95% of participants perceived ice cream as harmful to health/fitness goals, whereas 100% of participants perceived salad as helpful to health/fitness goals. On a self-report likert scale with response options ranging from 1 (extremely harmful) to 6 (extremely helpful), participants also indicated that ice cream ( $M = 2.10$ ,  $SD = .97$ ) is significantly more harmful to health/fitness goals than salad ( $M = 5.45$ ,  $SD = .69$ ),  $t(19) = -11.11$ ,  $p < .001$ .

To investigate the influence of the experimental manipulations on self-regulatory attitudes, a 2 (Goal Domain: Health/Fitness vs. Non-Health/Fitness) x 2 (Goal



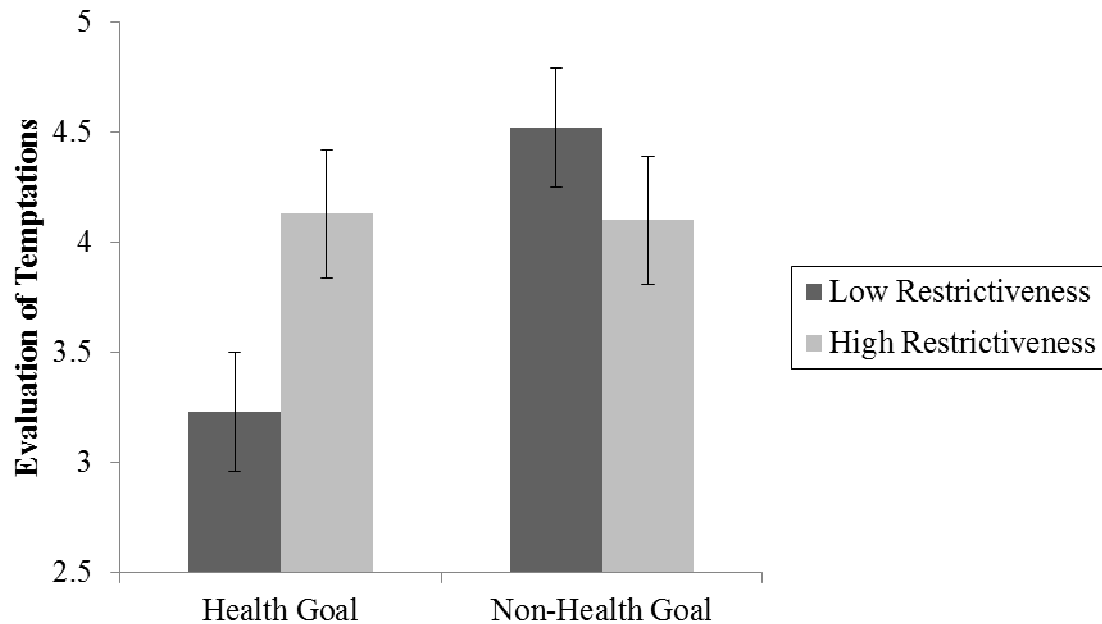
Restriction: High vs. Low) between-subjects ANCOVA was conducted, using participants' pre-tested commitment to a health/fitness goal as the covariate. As shown in Table 1, this analysis revealed a main effect for goal domain,  $F(1, 58) = 5.12, p < .05, \eta_p^2 = .08$ , which was qualified by the expected interaction between goal domain and restrictiveness,  $F(1, 58) = 5.92, p = .018, \eta_p^2 = .09$ . Planned comparisons (Bonferroni adjustment) showed that when a health/fitness goal was activated, a less restrictive goal frame ( $M = 3.23, SE = .27$ ) caused participants to exhibit attitudes consistent with greater self-regulation than a highly restrictive goal frame ( $M = 4.13, SE = .27$ ),  $F(1, 58) = 5.58, p < .05, \eta_p^2 = .09$ . When a health/fitness goal was not activated, however, participants with a less restrictive goal frame ( $M = 4.52, SE = .27$ ) reported similar attitudes as participants with a highly restrictive goal frame ( $M = 4.10, SE = .29$ ),  $F(1, 58) = 1.12, p > .05, \eta_p^2 = .02$ . The means for each condition are depicted in Figure 1.

Table 1.

*Summary of Analysis of Covariance*

Source	SS	DF	MS	F
Health/Fitness Goal <sup>a</sup>	1.37	1	1.37	1.21
Goal Domain	5.79	1	5.79	5.12*
Goal Restrictiveness	.853	1	.853	.755
Domain x Restrictiveness	6.69	1	6.69	5.92*
Error	65.55	58	1.13	

*Note.* <sup>a</sup>Covariate, \* $p < .05$



*Note.* Error Bars represent standard errors.

*Figure 1.* The effect of goal domain and goal restrictiveness on self-regulation.

## Discussion

When a goal is activated, self-regulation is used to facilitate its attainment (Bargh and colleagues, 1990; 1994; 2001; Fishbach, et al., 2003), one consequence of which is a greater valuation of the goal and a devaluation of temptations (Trope & Fishbach, 2000). Study 1 replicated this pattern of results only when an activated goal was not perceived as highly restrictive. When presented with a less restrictive health/fitness goal, participants exhibited a decreased desire to indulge in temptations. When that goal was highly restrictive, however, participants reported an increased desire to indulge in temptations. Indeed, these participants reported approximately the same level of desire for temptations as participants without an active health/fitness goal, indicating a retardation of self-control processes. These findings provide initial support for my first prediction:

increased reactance due to a highly restrictive goal frame caused a shift in participant attitudes toward temptations and away from proper self-regulation.

Although the results from Study 1 are consistent with my first research hypothesis, participants were merely asked to report their attitudes, which are antecedents of behavioral engagement (Fishbach, 2009). Ultimately, self-regulation involves conforming one's *behavior* as well as attitudes in order to attain some desired standard (Schmeichel, et al., 2010). Therefore a second study was designed to test whether highly restrictive standards will result in a failure to properly regulate one's goal-directed behavior.

## **Study 2**

The purpose of Study 2 was to investigate another implication of my first hypothesis: whether highly restrictive self-regulatory goals cause people to indulge in temptations. Study 2 conceptually replicated and extended the findings of Study 1 by investigating a behavioral rather than attitudinal consequence of reactance on self-regulation. Study 2 used methods similar to those used in Study 1.

## **Method**

**Participants.** Fifty-seven undergraduate psychology students (46 female, 11 male) from the University of Maryland participated in exchange for course credit. The age of participants ranged from 18 to 22, with a mean age of 18.95 years.

**Procedure.** Goal domain (health/fitness vs. non-health/fitness) and the restrictiveness of that goal (high vs. low) were manipulated. Study 2 used the same cover story and demographics measure as used in Study 1.

**Goal Domain.** The goal domain was manipulated using the same procedure as was used in Study 1.

**Goal Restriction.** Goal restriction was also manipulated using the same procedure as was used in Study 1.

After viewing the final advertisement participants were asked the following questions, “Which was your favorite advertisement?” and “What about that advertisement made it your favorite?” These items were not of theoretical interest, and were intended to bolster the cover story of the experiment. After answering the foregoing items, participants were informed that the original experiment was “over,” but because they had registered for an hour long timeslot, they would subsequently complete an unrelated “pilot study” for another experimenter. The experimenter then left the room in order to get the materials for the pilot study, which served as the dependent measure.

**Self-Regulatory Behavior.** The dependent measure was a behavioral measure of self-regulation. Participants were told that the task was designed to help a colleague pre-test the desirability of a range of food items, and that they would evaluate the desirability of snack size cookies. Consistent with the methodology of Dalton, Chartrand, and Finkel (2010), a small bowl of Chips Ahoy snack sized cookies was then placed in front of the participants along with a questionnaire titled “Food Evaluation Survey.” As in Dalton et al. (2010), participants were informed, “you can have as many cookies as you would like, but please eat at least one before filling out the questionnaire.” The Food Evaluation Survey (see Appendix B) contained seven total questions related to the food item, and was intended to bolster the cover story that the task was a pilot test for another experiment. Items 1-4 were not of theoretical interest, and were only included to

maximize the believability of the survey. Items 5, 6, and 7, however, were included as a check on participants' attitudes toward the temptation (cookies). These items were, "I would eat this item in the future," "This item is one of my favorite types of food," and "I do not like this item (R)." Participants responded on a likert type scale with response option from 1 (strongly disagree) to 7 (strongly agree). After the last item was reverse coded, the three items were averaged to create an index of participants' attitudes.

In order to minimize participants' concern of being evaluated while eating, the experimenter then left the room for exactly five minutes in order to "set up materials for the next participant." The primary dependent measure was the number of cookies participants ate during the five minutes time period. Ultimately, a health/fitness goal requires individuals to monitor their level of caloric intake, thus self-control was required to minimize the amount of tempting cookies that participants ate (Dalton et al., 2010). Finally, participants were checked for suspicion, fully debriefed, and thanked for their participation.

## **Results**

A preliminary analysis showed that there were no effects due to gender, so it was excluded from all further analyses.

**Self-Regulatory Behavior.** In a pilot test ( $N = 31$ ), 97% of participants perceived Chips Ahoy cookies as harmful to a health/fitness goal. Moreover, on a self-report Likert scale with response options from 1 (extremely harmful) to 8 (extremely helpful), participants perceived Chips Ahoy cookies ( $M = 2.39$ ,  $SD = .95$ ) as equally harmful to a health/fitness goal as ice cream ( $M = 2.39$ ,  $SD = 1.17$ ),  $t(30) = 0.0$ , *ns*.

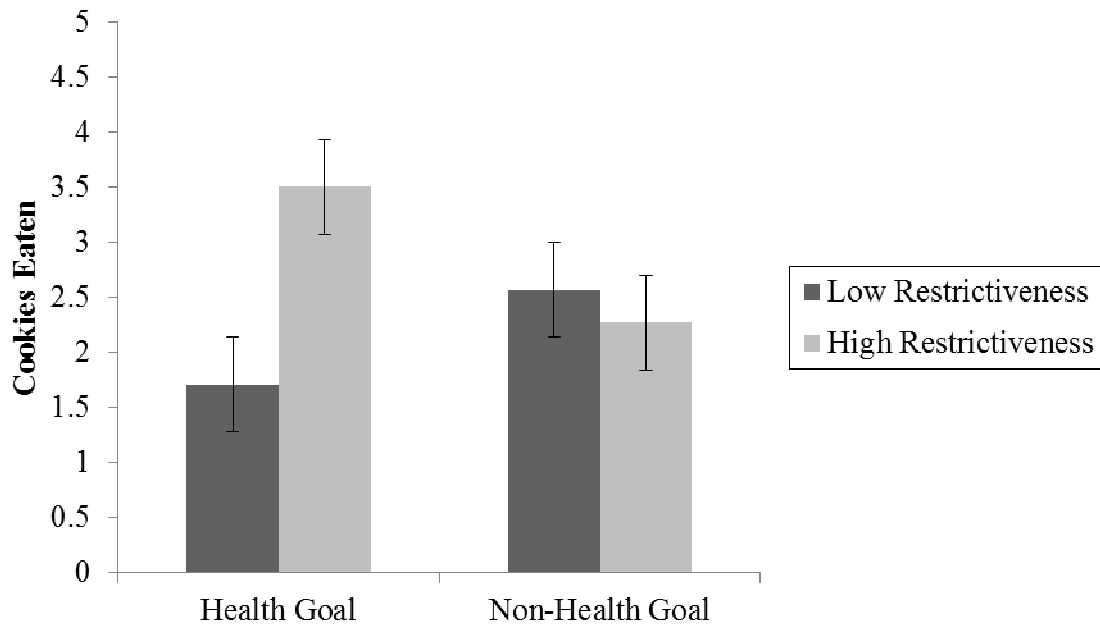
To investigate the influence of the experimental manipulations on self-regulatory behavior, a 2 (Goal Domain: Health/Fitness vs. Non-Health/Fitness) x 2 (Goal Restriction: High vs. Low) between-subjects ANOVA was conducted. As shown in Table 2, this analysis revealed a marginally significant main effect for goal restrictiveness,  $F(1, 53) = 3.17, p = .09, \eta_p^2 = .05$ , which was qualified by the expected interaction between goal domain and restrictiveness,  $F(1, 53) = 6.03, p < .05, \eta_p^2 = .10$ . Planned comparisons (Bonferroni adjustment) revealed that when a health/fitness goal was activated, a less restrictive goal frame ( $M = 1.71, SE = .43$ ) caused participants to eat significantly fewer cookies than a highly restrictive goal frame ( $M = 3.50, SE = .43$ ),  $F(1, 53) = 8.65, p < .01, \eta_p^2 = .14$ . When a health/fitness goal was not activated, however, participants with a less restrictive goal frame ( $M = 2.57, SE = .43$ ) ate as many cookies as participants with a highly restrictive goal frame ( $M = 2.27, SE = .42$ ),  $F(1, 53) = .26, p > .05, \eta_p^2 = .005$ . The means for each condition are depicted in Figure 2.

Table 2

*Summary of Analysis of Variance: Behavior*

Source	SS	DF	MS	F
Goal Domain	.50	1	.50	.20
Goal Restrictiveness	7.81	1	7.81	3.03 <sup>a</sup>
Domain x Restrictiveness	15.56	1	15.56	6.03*
Error	136.7	53	136.7	

*Note.* \* $p < .05$ , <sup>a</sup> $p < .10$



*Note.* Error bars represent standard error.

*Figure 2.* The effect of goal domain and goal restrictiveness on self-regulation.

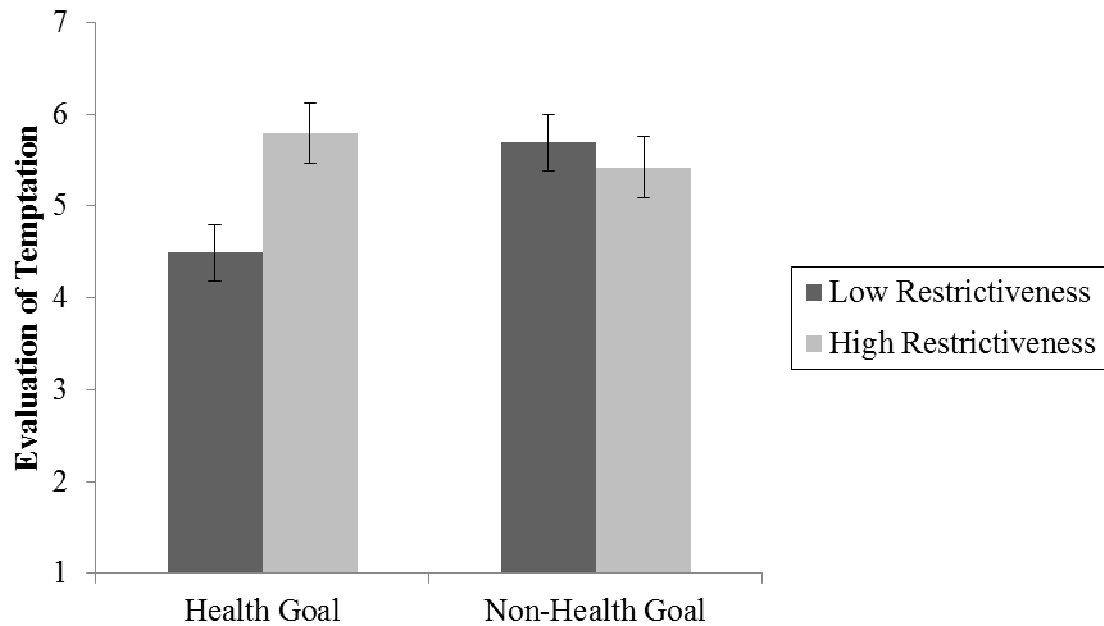
To check participants' attitudes toward the temptation, a 2 (Goal Domain: Health/Fitness vs. Non-Health/Fitness) x 2 (Goal Restriction: High vs. Low) between-subjects ANOVA was conducted. As shown in Table 3, this analysis revealed the expected interaction between goal domain and restrictiveness,  $F(1, 52) = 6.32, p < .05, \eta_p^2 = .11$ . Planned comparisons demonstrated that a less restrictive health/fitness goal resulted in attitudes more consistent with effective self-regulation ( $M = 4.49, SE = .32$ ) than a highly restrictive health/fitness goal ( $M = 5.79, SE = .31$ ),  $F(1, 52) = 8.39, p < .01, \eta_p^2 = .14$ . When a health/fitness goal was not activated, however, there was no difference in participant attitudes between less restrictive ( $M = 5.69, SE = .31$ ) and highly restrictive conditions ( $M = 5.42, SE = .30$ ),  $F(1, 52) = .38, p > .05, \eta_p^2 = .01$ . The means for each condition are shown in Figure 3.

Table 3

*Summary of Analysis of Variance: Attitudes*

Source	SS	DF	MS	F
Goal Domain	2.46	1	2.46	1.82
Goal Restrictiveness	3.71	1	3.71	2.73
Domain x Restrictiveness	8.57	1	8.57	6.32*
Error	70.48	52	70.48	

Note. \* $p < .05$



Note. Error bars represent standard error.

*Figure 3.* The effect of goal domain and goal restrictiveness on attitudes toward temptation.



## **Discussion**

The results from Study 2 conceptually replicate and extend the findings from the first study to a behavioral measure of self-control. When a health/fitness goal was activated, highly restrictive framing caused participants to consume significantly more cookies than a less restrictive framing. When a health/fitness goal was not activated, goal framing had no effect on cookie consumption. Moreover, an investigation of participants' attitudes about the temptation (cookies) in Study 2 yielded results similar to those of Study 1. Consistent with prior research (e.g., Bargh et al., 2001) participants reported a less positive evaluation of temptations when a (less restrictive) health/fitness goal was activated. When the goal was highly restrictive, however, participants evaluated the temptations significantly more positively. When no health/fitness goal was activated, goal framing had no effect on temptation evaluation.

Overall, the reactance attributable to a highly restrictive goal demand seemed to motivate individuals to restore a sense of freedom, which across studies was expressed as an increased desire for temptations (Study 1) and an increased indulgence in temptations (Study 2). Taken together, these two studies provide strong support for my first research hypothesis: highly restrictive standards are more detrimental to self-regulation than less restrictive standards.

Although Studies 1 and 2 provide strong empirical support for my first hypothesis, Study 3 aims to provide a fuller understanding of the possible connection between reactance and self-regulatory failure. To do this, a study was designed to investigate the potential of highly restrictive goals to induce ego depletion, a state that

has been demonstrated to result in self-regulatory failure across multiple domains (Baumeister et al., 2007). In this view, highly restrictive goals would activate reactance, increasing the perceived desirability of a temptation. It would thus require greater self-control to abstain from the temptation, causing greater ego depletion (Baumeister et al., 1994). Higher levels of ego depletion would contribute to the increased likelihood of self-regulatory failure attributable to highly (vs. less) restrictive goals (as seen in Studies 1 and 2).

### **Study 3**

The purpose of Study 3 was to explore whether highly restrictive goals cause greater ego depletion than less restrictive goals. As such, Study 3 investigated a possible cognitive mechanism (i.e., executive function fatigue) that might contribute to the goal restrictiveness effect. Every participant was assigned a diet goal, which varied in restrictiveness. Additionally, tempting items (fun sized chocolate bars) were either present or absent while participants were assigned their goal. Finally, consistent with previously established methodology (e.g., Baumeister et al. 1998), participants engaged in an ostensibly unrelated self-control task, which served as the dependent measure of ego depletion.

### **Method**

**Participants.** 109 undergraduate psychology students from the University of Maryland were recruited to participate in exchange for course credit. Eleven participants (10.1%; 7 highly restrictive condition, 4 less restrictive condition) ate at least one piece of chocolate during the course of the experimental session. These participants were

excluded from all analyses because the glucose in chocolate has been found to replenish self-control resources shortly after consumption (Gailliot et al., 2007), which would confound any conclusion that could be reached based upon these data. Their exclusion does not significantly alter the results in any way. Thus, a total of 98 participants (59 female, 39 male) remained for the final analysis. The age of included participants ranged from 18 to 22, with a mean age of 19.17 years.

**Procedure.** Empirical investigations of ego depletion have typically adopted a dual task paradigm (Baumeister et al., 1998; Gailliot et al., 2007; Schmeichel & Vohs, 2009), in which the first task is either the experimental manipulation (hypothesized to require greater self-control) or a control condition (less self-control), and the second is the same self-control task for both the experimental and control groups. The current investigation used a modified version of this dual task paradigm. The first “task” assigned participants to a diet goal, which was framed as either highly restrictive (requiring greater self-control) or less restrictive (less self-control). The second was an unrelated self-control task, the cold pressor (Schmeichel & Vohs, 2009).

Participants were told that the study was an investigation of how different means influence the pursuit of a goal; specifically how having a list of acceptable food items influences how well people stick to a diet. The experimenter explained that he had to assess their current eating habits and then standardize their diets. Participants then completed the demographics form that was used in Studies 1 and 2 and a diet/health goal commitment questionnaire (See Appendix C), which was described as the assessment of current eating habits, but was actually used to measure and control for their commitment

to a diet/health goal. Participants were then informed that, for the next week, they would have the goal of eating in a healthful manner.

**Goal Restriction.** Those in the highly restrictive goal condition were told that they “*must only* eat healthy food”, and that they “are *not allowed* to eat junk food” for the entirety of the seven-day period. Every food item that they did eat also had to be from an approved list of healthy food items. Participants were then provided with the list of healthy food items (See Appendix C).

Participants in the less restrictive condition were told that they “should eat healthy food and avoid junk food” for four of the seven-day period, leaving three days where participants could eat at their discretion. They were then given the same list of healthy food items. According to Brehm & Brehm (1981), the magnitude of reactance experienced is a function of the number and proportion of freedoms threatened. Brehm, McQuown, & Shaban (reported in Brehm, 1966) demonstrated this principle by threatening participants’ freedom to watch either one of three (33%) or one of six (17%) movie options. Whereas 56% of the participants in the one-of-three condition rated the threatened alternative as significantly more attractive, only 11% of the participants in the one-of-six condition did so. Because a greater proportion of their freedoms were threatened, the one-of-three participants ostensibly experienced a greater magnitude of reactance and thus were more likely to perceive the threatened alternative as more attractive. Similarly, participants in the highly restrictive condition of Study 3 had more total freedoms as well as a greater proportion of their freedoms threatened (no junk food for all seven days as opposed to four out of seven days).

**Temptation Presence.** A large serving dish filled with fun-sized chocolate bars of various varieties with a small sign that read, “For participants – take one,” was approximately two feet from all participants. After the experimenter handed the list of healthy food items to the participants, he looked mildly surprised and said, “So it is ironic that one of the bowls of candy is in here considering what this experiment is about. You see, this is only one of many studies that are run in this lab, and these candy bars are for all of our participants. For this study, though, it’s probably not the most fitting.” The experimenter then either removed the bowl from the room (temptation-absent condition), or left the bowl where it was (temptation-present condition).

Participants then completed the Positive and Negative Affect Schedule, or PANAS (Watson, Clark, & Tellegen, 1988b), which was included in order to measure and control for possible mood effects due to goal condition, and was described as an evaluation of initial reactions to the diet plan (See Appendix C). Afterwards, it was explained that the experiment was “over,” but because participants had signed up for a one-hour timeslot and the experiment was less than that, they would complete a “quick pilot study” for another experimenter in order to receive full participation credit. The experimenter then left the room for exactly five minutes in order to “set up the materials for the pilot study.” Participants in the temptation present condition were left alone in the room with a bowl of free chocolate bars. This condition was closely tied to Baumeister et al.’s (1998) manipulation of self-control resources; when participants forced themselves to abstain from eating chocolates, they subsequently quit faster on unsolvable puzzles than participants who did not have to abstain from eating chocolates.

**Self-Control Resources.** The pilot study was described as an investigation of how physiological strain influences thought generation. Specifically, participants completed the cold pressor task, in which they placed their hand in a cooler filled with ice water (circulated by an air pump to maintain temperature) for “as long as they can.” After withdrawing their hand from the cooler, participants were asked to write down their first five thoughts as quickly as they could. The task was described as predictive of an individual’s success in stressful or strenuous situations, ostensibly an important aspect of professional success.

The dependent measure was the length of time that participants kept their hand in the ice water. This task requires self-control because one must inhibit the impulse to take his or her hand out of the ice water. Keeping one’s hand in it is painful. After completing the dependent measure, participants were asked how restrictive they found their diet goal, a question that the experimenter ostensibly forgot to ask during the original experiment. They were asked to respond orally, from 1 (not restrictive) to 10 (extremely restrictive). Finally, participants were checked for suspicion, fully debriefed, and thanked for their participation.

## **Results**

A preliminary analysis showed that there were no effects due to gender, so it is excluded from all further analyses.

**Independent Variable Check.** To check perceptions of goal restrictiveness, a 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) between-subjects ANOVA was conducted. Participants in the highly restrictive condition ( $M = 5.70$ ,  $SE = .29$ ) reported slightly greater perceptions of restrictiveness than participants in

the less restrictive condition ( $M = 5.00$ ,  $SE = .32$ ), but this difference did not reach significance,  $F(1, 94) = 2.62$ ,  $p = .10$ . There were no other significant effects.

**Mood Effects.** As a check on the experimental manipulations' effect on mood, parallel 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) ANOVAs were conducted on the Positive and Negative Affect subscales of the PANAS (Watson, et al. 1988b). There were no significant effects.

**Self-Control Resources.** To investigate the influence of the experimental manipulations on self-control resources, a 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) between-subjects ANCOVA was conducted, using participant's self-reported commitment to a health/diet goal as the covariate. Participants in the temptation absent condition were able to keep their hand in the ice water longer ( $M = 49.44$ ,  $SE = 7.50$ ) than participants in the temptation present condition were ( $M = 31.69$ ,  $SE = 8.47$ ),  $F(1, 93) = 2.46$ ,  $p = .12$ ,  $\eta_p^2 = .03$ . While this effect was in the expected direction, it was only marginally significant. The predicted interaction between goal restrictiveness and temptation presence failed to reach significance,  $F(1, 93) = 0.22$ ,  $p > .05$ ,  $\eta_p^2 = .002$ . The means for all conditions are shown in Figure 4.

Given that the experimental manipulation of goal restrictiveness was closely yoked to previously used manipulations of reactance (e.g., Worchel & Brehm, 1970), the frequency with which the cold pressor task has been used as a measure of self-control in the past (Hagger, Wood, Stiff, & Chatzisarantis, 2010), and that resisting chocolates has been found to deplete self-control resources in previous experiments (Baumeister et al., 1998), the lack of a significant independent variable check combined with the lack of a significant difference between the temptation present and temptation absent conditions on

the cold pressor task was quite surprising. These surprising results, along with concerning reports from research assistants detailing a lack of participant engagement and conscientiousness during the last week of the semester, prompted a second look at the results.

Of the 11 participants disqualified from final analyses for eating one or more pieces of chocolate during the experiment, over half (55%) participated during the final week of the semester; a dramatically higher disqualification rate (27.3%) than that of all previous participants (6.6%). The disproportionately high degree of disqualifications during this time suggested that the final week's participants ( $N = 22$ ) may have acted in a way that skewed the data. When one considers that the University of Maryland's psychology experiment participant pool allows students to select their own dates and times of participation in exchange for extra credit, it is not surprising that, on average, the final week of participants may not be as fully engaged in their experiments as earlier participants. A fairly common practice amongst these students is to put off their experimental participation until the end of a semester, and then register for multiple experiments within a few days' time (a minimum of five credit hours is required to gain extra credit). They are then typically under time pressure to complete their experiments as well as prepare for final examinations. Because they will gain extra credit just for "showing up," and cannot lose it due to a lack of engaged responding or focus, their motivation is likely to simply satisfy their requirement in order to gain the contingent extra credit and move on to other pressing needs, rather than to learn about psychology through their thoughtful participation in the experimental process. Consistent with this notion are findings by Wang & Jentsch (1998) which demonstrated personality and



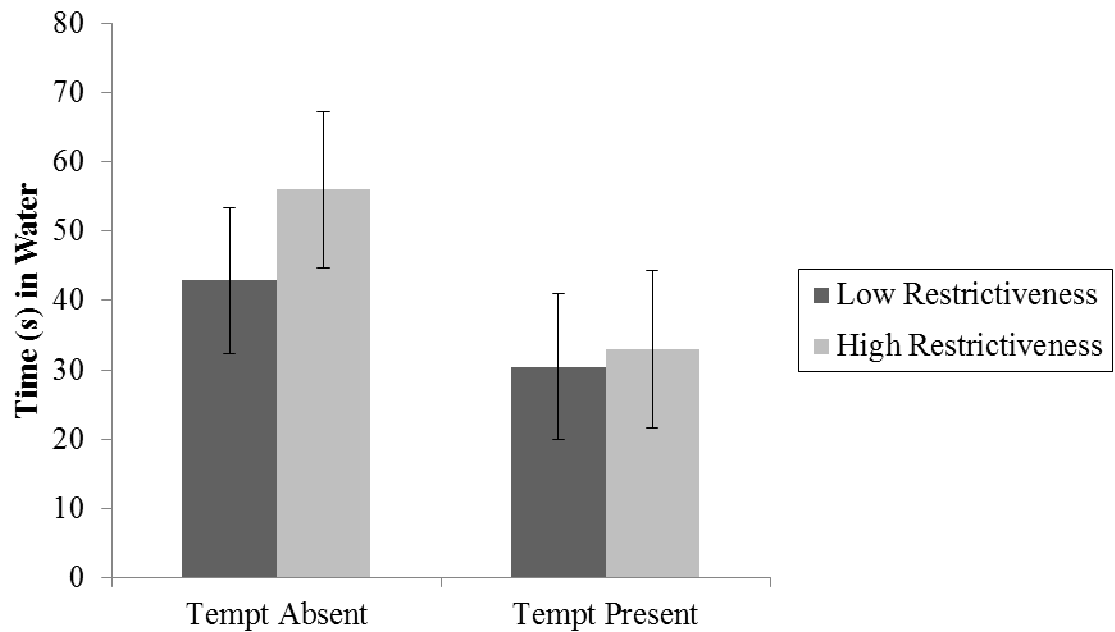
motivational differences between early and late-semester participants. Specifically, early semester participants were found to be more socially responsible (Holden & Reddon, 1987), more compliant (Masling, O'Neill, & Jayne, 1981), and were more academically and achievement oriented (Evans & Donnerstein, 1974) than late semester participants. These empirical findings, along with disconcerting research assistant reports, and the strange pattern of results found indicated that a reanalysis of the data, without the final week's participants, might help to clarify the results of Study 3.

**Abridged Analysis.** Indeed, when the data are analyzed without the final week's participants, a much different picture emerges. As to perceived goal restrictiveness, a 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) between-subjects ANOVA demonstrated a significant main effect of goal restrictiveness. Participants in the highly restrictive condition ( $M = 5.70$ ,  $SE = .32$ ) perceived their goal as more restrictive than participants in the less restrictive condition ( $M = 4.73$ ,  $SE = .35$ ),  $F(1, 72) = 4.58$ ,  $p < .05$ .

Participants' mood remained unaffected by the experimental manipulations, as demonstrated by non-significant 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) between-subjects ANOVAs,  $F(1, 72) = 2.53$ ,  $p > .05$  for PA and  $F(1, 71) = .87$ ,  $p > .05$  for NA.

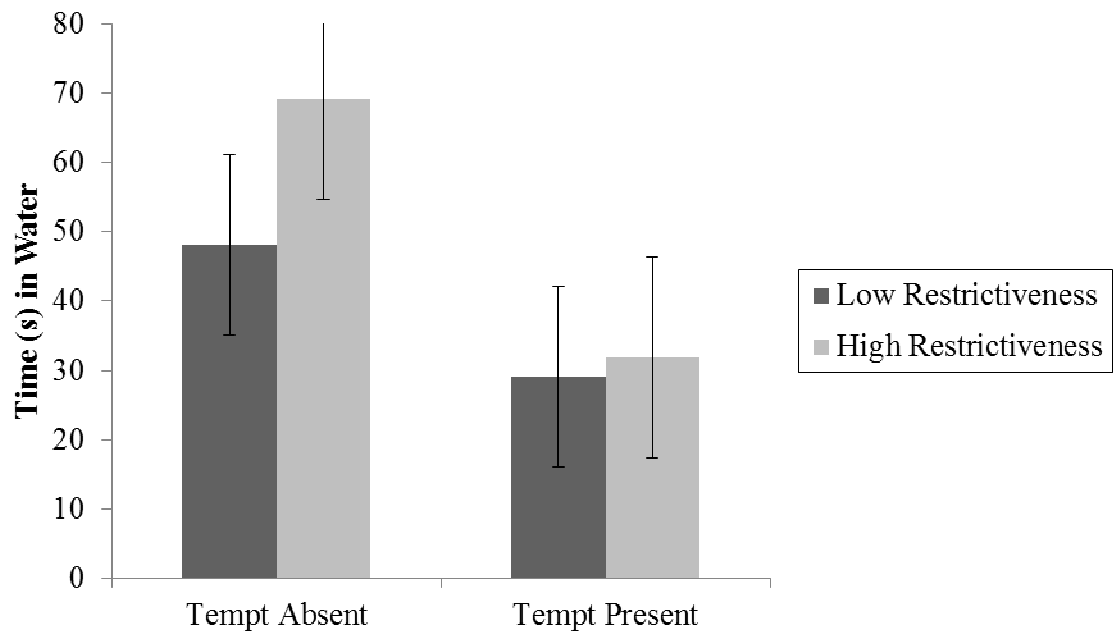
Finally, as to the main dependent measure, a 2 (Goal Restriction: High vs. Low) x 2 (Temptation Presence: Present vs. Absent) between-subjects ANCOVA, using participants' commitment to a diet/health goal as covariate, revealed a significant main effect of temptation presence on cold pressor task persistence. Participants in the temptation absent conditions kept their hands in the ice water ( $M = 58.67$ ,  $SE = 9.54$ ) for

a significantly longer period than participants in the temptation present conditions ( $M = 30.52$ ,  $SE = 10.33$ ),  $F(1, 71) = 4.01$ ,  $p < .05$ ,  $\eta_p^2 = .05$ . No other significant effects emerged. The means for all conditions are presented in Figure 5.



*Note.* Error bars represent standard error.

*Figure 4.* The effect of temptation presence and goal restrictiveness on cold pressor task persistence (N = 98).



*Note.* Error bars represent standard error.

*Figure 5.* The effect of temptation presence and goal restrictiveness on cold pressor task persistence (N = 76).

## Discussion

Neither the full nor abridged analysis supported hypothesis 2: that highly restrictive standards cause greater ego depletion than less restrictive standards. The full analysis of all 98 participants did not produce any statistically significant effect, whereas an analysis excluding the final week of participants, conducted due to a confluence of factors suggesting that these participants may have skewed the data due to a lack of conscientious responding, found a significant effect of temptation presence: when temptations were present in the experimental room participants persisted at the cold pressor task for a significantly shorter period of time than when temptations were absent.

**Manipulation of Reactance.** One explanation as to why hypothesis 2 was not supported is that it is possible the experimental manipulation of reactance was not successful. An independent variable check of the goal restrictiveness variable did indeed demonstrate that participants in the highly restrictive condition perceived the goal to be more restricting than participants in the less restrictive condition; however, this was not a treatment check of reactance and the findings do not definitively indicate a successful manipulation of reactance, only a successful manipulation of perceptions of goal restrictiveness. As Brehm & Brehm (1981) have noted, self-report is not an adequate measure of reactance, only of the antecedents of reactance (i.e., the restrictive statements). One can, however, look to theoretically consistent attitude and behavioral consequences as indicators of a reactant state (e.g., participants' desire for the chocolate). If there are no other viable alternative explanations, then these changes must be due to the presence of reactance. Due to the cover story, that the chocolate was mistakenly left in the experimental room, a measure of chocolate desirability could not have been included, as it might have aroused suspicion. Nonetheless, given the wealth of empirical research which has demonstrated the reactance-producing effects of freedom restriction (Brehm, 1966; Brehm & Brehm, 1981; Heilman, 1976), it seems likely that reactance was manipulated, and the explanation for the results lies elsewhere.

**Reactance and Ego Depletion.** Perhaps the best explanation that can be inferred from the data is that goal restriction produces reactance, and reactance influences self-regulation without first depleting self-control resources. The significant effect of temptation presence on participants' persistence suggests that the cold pressor task adequately indicated greater (temptations present) and less (temptations absent) ego

depletion. Additionally, evidence suggests that reactance was manipulated. The null findings, then, potentially indicate that high levels (vs. lower levels) of reactance do not produce significantly greater levels of ego depletion.

When a self-regulatory goal is highly restrictive, reactance may relatively automatically (i.e., without purposeful & effortful intervention by the self; Baumeister et al., 2007) motivate people to restore their freedom by sabotaging the goal. In Studies 1 and 2, this resulted in the bolstering of a temptation's value, and an increased indulgence in a temptation. Research on nonconscious goal pursuit supports this supposition.

According to Baumeister et al. (2007), nonconscious self-regulation (e.g., nonconsciously activated and pursued goals) does not entail effortful intervention by the self, and therefore does not deplete self-control resources. For instance, Bargh et al. (2001) demonstrated that goal-directed behavior may occur outside of conscious awareness by supraliminally priming participants via word search puzzle with the concept of "achievement" or "cooperation," and observing that these participants subsequently achieved better performance or cooperated with a partner more readily than participants who had not been primed, even though they could not elucidate the reason for their behavior. Like nonconscious goals, it is possible that highly restrictive (vs. less restrictive) goals operate in a manner that does not place significantly greater strain on executive resources, though future research is required to provide further support for this idea.

## Chapter 3: General Discussion

As self-regulation is essentially a process of changing the self to attain some goal or standard (Schmeichel et al., 2010), the attributes of our goals or standards exert a great deal of influence over whether our self-regulatory attempts ultimately succeed or fail (Baumeister et al., 2007). Across three studies, I attempted to provide support for the idea that when one's goal is framed in terms of highly restrictive demands, it will be detrimental to self-regulation (hypothesis 1) and that these decrements are ultimately the result of ego depletion (hypothesis 2).

**Hypothesis 1.** The results of Study 1 demonstrated that people with a highly restrictive, as opposed to less restrictive, active health/fitness goal reported a greater desire for temptations. One well established consequence of goal activation is a shift in attitudes which serves to bolster goal pursuit (Trope & Fishbach, 2000), yet participants with a *highly restrictive* goal reported attitudes similar to people with *no* active goal: a greater desire for temptations than the less restrictive goal group, indicating a retardation of the goal bolstering process. Study 1's findings are important because attitudes are key antecedents of self-regulatory engagement (Fishbach, 2009), and the attitudes reported by people with a highly restrictive goal were consistent with self-regulatory failure. Study 2 sought to address the question of whether or not the consequences of highly restrictive goal demands would go beyond attitude change and cause self-regulatory failure by directly investigating temptation indulgence. Study 2 conceptually replicated and extended the findings of Study 1 by showing that people with a highly restrictive health/fitness goal indulged in temptations to a significantly greater extent (i.e., ate significantly more cookies) than people with a less restrictive health/fitness goal. These

findings, which demonstrated the detrimental effects on self-regulation of highly restrictive goals, have significant theoretical and practical implications.

Studies 1 and 2 provided support for the goal restriction effect, whereby the reactance produced by highly restrictive goal demands motivates one to restore a sense of freedom by shifting one's attitudes and behaviors toward temptations and away from proper self-regulation. These studies also demonstrated that reactance can motivate behavioral change even when there is a concurrently opposing motivation (e.g., the goal to maintain a fit/healthy lifestyle), a heretofore uninvestigated aspect of reactance theory. Studies 1 and 2 provide clear pragmatic advice: do not make your goals too restrictive or you risk activating reactance and increasing the likelihood of abandoning goal pursuit. This advice may seem intuitive, but the reliance on highly restrictive goals is relatively commonplace. One need only conduct a quick internet search to find a multitude of "zero-tolerance" policies in place, and websites recommending "cold turkey" approaches for everything from budget balancing to weight loss. Consequently one may, with the best intentions, determine that he/she will exercise every day without fail. This goal is supported by a type of lay-theory, wherein exercising is good for health and not exercising is bad, so a goal that forces one to exercise must lead to quicker and better results. This does not appear to be true, however; according to Studies 1 and 2, which indicates that a less restrictive goal (e.g., incorporate exercise into my weekly routine) would be more likely to produce goal-consistent results.

Interestingly, the consequences of highly restrictive goals have even received little empirical attention in abstinence research, which naturally lends itself to the investigation of restrictive goals. Many of the sexual abstinence programs initiated in the

United States were a result of the Adolescent Family Life Act (Roosa & Christopher, 1990) passed in 1981. Unfortunately the majority of these programs were initiated without an adequate research design, resulting in the inability to make valid conclusions of their effectiveness (Hofferth & Hayes, 1987). Of the three programs generally considered to have used good research designs, only one reported on actual sexual behavior (as opposed to attitudes toward sex). Consistent with the goal restriction effect, that study demonstrated that there was actually an increase in sexual behaviors among the adolescents in the abstinence program rather than a decrease (Roosa & Christopher, 1990).

Realistically, some select regulatory pursuits may necessitate these absolutely restrictive standards due to the highly damaging consequences of a single indulgence (e.g., an addict quitting illicit drug use). In such cases complete abstinence may be required for the health of the individual. Ironically, in such situations, the importance of unbending adherence to the goal may be made more difficult by its high restrictiveness and the reactance caused by that restrictiveness.

**Reactance vs. Goal Difficulty.** I have argued throughout the current work that highly restrictive goals activate reactance, and that reactance leads to self-regulatory failure. Alternatively, it is theoretically plausible that highly restrictive goals may instead be construed as highly difficult goals (e.g., eating zero junk food is a very difficult goal to accomplish), and that these perceptions of goal difficulty rather than reactance may be what causes self-regulatory failure. It would be difficult to rule out the possibility that the demands attributable to highly restrictive goals could potentially produce either reactance or perceptions of goal difficulty. According to previous research, however,



only the former and not the latter would theoretically produce the pattern of results found in Studies 1 and 2.

Locke & Latham's (1990; 2002) goal setting theory states that highly difficult goals actually lead to performance gains rather than losses (as is the case in self-regulatory failure). In fact, highly difficult goals have been demonstrated to increase performance on over 100 different experimental tasks (Locke & Latham, 2002), including performance on an ergometer (Bandura & Cervone, 1983) and persistence at a prose memorization task (LaPorte & Nath, 1976). As such, if the highly restrictive goals used in Studies 1 and 2 activated perceptions of high goal difficulty as opposed to reactance, one would expect *improved self-regulation*, resulting in a reduced desire for temptations and less cookie consumption. Given that the results indicated *decreased self-regulation*, the most convincing explanation is that in this situation, high goal restriction activated reactance, which motivated participants to restore their freedom via bolstering the value of temptations (Study 1) and increased temptation indulgence (Study 2).

**Hypothesis 2.** The results of Study 3 did not support my second research hypothesis. An analysis of all but the final week's participants (conducted due to evidence which suggested a reduction in participant conscientiousness) found no effect of goal restrictiveness on self-control resource depletion. The analysis did, however, reveal a main effect of temptation presence: participants in the temptation present (vs. absent) conditions used more self-control, diminishing their resources and leading to a reduction in persistence on the subsequent cold pressor task. Given the significant independent variable check, and the litany of research demonstrating the reactance producing effect of freedom restriction, it is likely that reactance was successfully manipulated in Study 3.

What is more, the main effect of temptation presence suggests that the cold pressor task adequately measured ego depletion. Perhaps the most cogent explanation of the results, then, is that goal restrictiveness promotes reactance, which motivates individuals to restore their restricted freedom without causing ego depletion. As demonstrated in Studies 1 and 2, in the case of highly restrictive goals, what is threatened is the freedom to indulge in temptations. This suggests that, when an individual has such motivation, ego depletion is not a necessary antecedent of temptation indulgence. Of course, this supposition needs to be examined through future empirical studies. Key to these studies would be determining participants' active motivation (adhering to a self-regulatory goal or indulging in temptations) and measuring their effort expenditure, as only purposeful, effortful self-control drains resources (Baumeister et al., 2007).

**Limitations.** As with any research there are limitations to the current project. Consistent with a common limitation of social psychological research, the current project utilized a non-representative sample: specifically it was conducted exclusively with undergraduate psychology students, approximately 71% of whom across all studies were female (79% study 1, 80% study 2 and 60% study 3). Because the current project consisted exclusively of lab experiments (which provide the methodological benefit of experimental control) the over-sampling of female participants should only be of concern if these higher rates provided a cogent alternative explanation for the results. For instance, if females were worse at self-control or were more likely to experience reactance then it would be possible that goal restrictiveness only influenced self-regulation due to the over-representation of females in each study. Actually, Duckworth & Seligman (2006) found that, in high school academics, girls demonstrated more self-

discipline than boys. If this relationship held for the participants used in the current project, then it would have provided an even more rigorous test of the goal restriction hypothesis than originally intended. Additionally, no gender differences have been reported in the reactance literature (Brehm & Brehm, 1981; Miron & Brehm, 2006). Nevertheless, if future studies were able to use more gender balanced samples this limitation could be better addressed empirically.

Two other limitations of the current project that should be addressed are contained in Study 3 specifically. The first is the strength of the goal restrictiveness manipulation. While a treatment check revealed a statistically significant manipulation, the effect size was small, and so the difference between conditions may not have been “practically” significant. That is, the difference between treatment levels, although statistically significant, may not have been great enough to establish the experimental conditions necessary to cause a difference on the dependent measure. The second limitation is that the temptation presence variable may have masked any potential effect of the goal restrictiveness variable. I hypothesized that a highly restrictive diet goal would induce a higher level of reactance, requiring significantly greater self-control to inhibit the same temptation (chocolates) than would a less restrictive diet goal. It is possible that the salience and proximal location of the temptation required an unexpectedly high degree of self-control to inhibit, no matter what goal was assigned. If this was the case then the presence of the chocolates created a sort of ceiling effect, wherein participant self-control was essentially drained to the point that additional factors (i.e., reactance) would not result in greater observed decrements. The presence of the temptation, then, might have overwhelmed the restrictiveness variable.

**Future Directions.** A profitable avenue of research inspired by the current project involves examining the effect of reactance on self-regulation when one is ego depleted. Research has demonstrated that self-control failures occur more frequently at night than earlier in the day, and one reason for this is that self-control resources are used and depleted throughout the day (Baumeister et al., 2007). A potential future study, then, is to investigate the impact of reactance on self-regulation at high (e.g., at night) and low (e.g., in the morning) levels of self-control resource depletion. It might be that we are more sensitive to the energy-demanding restrictions of our goals when we are depleted, and thus are more likely to experience reactance and abandon these goals in order to conserve our remaining resources. Accordingly, reactance would cause greater self-control failure at higher levels of depletion than at lower levels. This could be explored by manipulating self-control resources and reactance, then directly measuring temptation indulgence, rather than ego depletion (as did Study 3).

**Conclusion.** This research provides evidence that highly restrictive standards cause self-regulatory detriments, including an increased valuation of temptations (Study 1) and an increased indulgence in temptations (Study 2). These results offer important insight into the self-regulatory process, and suggest one potential regulatory pitfall to avoid. Additionally, they provide a potential avenue of future research on reactance and self-regulation; specifically, investigating the effects of reactance at different levels of ego depletion.

## Appendix A

### Materials for Study 1

## DEMOGRAPHICS SURVEY

Please answer the following questions about yourself. Remember that all information collected is stored only by a random number.

1. Gender
  - ☐ Male
  - ☐ Female
2. Age \_\_\_\_\_
3. Year
  - ☐ Freshman
  - ☐ Sophomore
  - ☐ Junior
  - ☐ Senior
4. Major \_\_\_\_\_  
—
5. College GPA \_\_\_\_\_  
—
6. Race (check all that apply)
  - ☐ Caucasian
  - ☐ Hispanic
  - ☐ African American
- ☐ Asian
- ☐ Native American
- ☐ Pacific Islander
- ☐ Other
7. Political affiliation
  - ☐ Conservative
  - ☐ Independent
  - ☐ Liberal
  - ☐ Other
8. Religious affiliation
  - ☐ Catholic
  - ☐ Christian
  - ☐ Muslim
  - ☐ Jewish
  - ☐ Buddhist
  - ☐ Agnostic
  - ☐ Atheist
  - ☐ Other
9. Sexual affiliation
  - ☐ Heterosexual
  - ☐ Homosexual
  - ☐ Bisexual
10. Residential status
  - ☐ On campus
  - ☐ Off campus

Dummy Advertisements (counterbalanced)

## Furniture for living

Furniture should

look good, be comfortable,

and fit your life.

People know:



## Style4less Clothing

Great selection,

Costs less-

Style-4-Less Clothing



Final Advertisement (contains manipulations)

## Oat Health Chews



Dieters Know:

You have no choice,  
you want to eat well  
so why not make your snack delicious?

This advertisement features a top-down view of a white tray containing several rectangular, golden-brown oat health chews. The chews are arranged in two rows. A blue diagonal banner in the upper right corner reads "Dieters Know:". Below the tray, three lines of text are displayed in blue boxes: "You have no choice,", "you want to eat well", and "so why not make your snack delicious?".

## Hardware Products



Contractors Know:

You have no choice,  
you want to live well  
so why not make your rooms beautiful?

This advertisement shows a close-up of a chrome faucet and two handles on a dark sink. The background is a wall of small, square, light-colored tiles. A blue diagonal banner in the upper right corner reads "Contractors Know:". Below the faucet, three lines of text are displayed in blue boxes: "You have no choice,", "you want to live well", and "so why not make your rooms beautiful?".



## Oat Health Chews



It is your choice,  
you want to eat well  
so why not make your snack delicious?

## Hardware Products



It is your choice,  
you want to live well  
so why not make your rooms beautiful?



## Consumer Evaluative Summary Report Questionnaire

# CONSUMER EVALUATIVE SUMMARY REPORT

-A consumer preferences report-

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Please evaluate the following items how you feel right now, rather than how you think you ought to feel, or how you have felt in the past.

Also be aware that these evaluations will not be used to market any of the products contained on this form. This form will be used to determine your general consumer product preferences.

You will now be shown twelve consumer products. Please read the question in bold print and circle your answer about each item directly on this sheet.

---

## CONSUMER PRODUCT INVENTORY

**Question: How desirable are the following items to you?**

	Not Desirable					Very Desirable	
1. Laptop Computer	1	2	3	4	5	6	7
2. Sleeper Sofa	1	2	3	4	5	6	7
3. Designer Jeans	1	2	3	4	5	6	7
4. Ice Cream	1	2	3	4	5	6	7
5. 3D Television Set	1	2	3	4	5	6	7

6. Smart Phone	1	2	3	4	5	6	7
7. Pizza	1	2	3	4	5	6	7
8. GPS device	1	2	3	4	5	6	7
9. Designer Shoes	1	2	3	4	5	6	7
10. Patio Set (table, chairs)	1	2	3	4	5	6	7
11. Body Wash	1	2	3	4	5	6	7
12. Salad	1	2	3	4	5	6	7

**Question: How much would you like to own/eat/wear the following items?**

	Not At All				Very Much			
1. Laptop Computer	1	2	3	4	5	6	7	
2. Sleeper Sofa	1	2	3	4	5	6	7	
3. Designer Jeans	1	2	3	4	5	6	7	
4. Ice Cream	1	2	3	4	5	6	7	
5. 3D Television Set	1	2	3	4	5	6	7	
6. Smart Phone	1	2	3	4	5	6	7	
7. Pizza	1	2	3	4	5	6	7	
8. GPS device	1	2	3	4	5	6	7	
9. Designer Shoes	1	2	3	4	5	6	7	
10. Patio Set (table, chairs)	1	2	3	4	5	6	7	

11. Body Wash	1	2	3	4	5	6	7
12. Salad	1	2	3	4	5	6	7

## Appendix B

### Materials for Study 2

#### FOOD EVALUATION SURVEY

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1. The food item had a pleasing texture.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

2. The food item was too sweet.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

3. The food item was too bland.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

4. The food item had visual appeal (i.e., it looked good).

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

5. I would eat this food item in the future.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

6. This food item is one of my favorite types of food.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

7. I do not like this food item.

Strongly Disagree    1       2       3       4       5       6       7 Strongly Agree

## Appendix C

### Materials for Study 3

#### Diet/Health Goal Commitment Questionnaire

##### Goal Attitudes, Beliefs, Behaviors Survey

Please read through the following items and circle the response that best represents how you feel. Please mark only one answer for each item.

How committed are you to the goal of maintaining a healthy diet?

1	2	3	4	5	6	7	8	9	10
Not at all								Extremely	
Committed								Committed	

I find it personally important to maintain a healthy diet.

1	2	3	4	5	6	7	8	9	10
Strongly								Strongly	
Disagree								Agree	

I am health conscious about what I eat.

1	2	3	4	5	6	7	8	9	10
Strongly								Strongly	
Disagree								Agree	

How would you evaluate the goal of maintaining a healthy diet?

1	2	3	4	5	6	7	8	9	10
Extremely								Extremely	
Negative								Positive	

## Positive and Negative Affect Schedule (PANAS)

### Feelings and Mood Scale

INSTRUCTIONS: This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers:

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

\_\_\_ interested

\_\_\_ irritable

\_\_\_ distressed

\_\_\_ alert

\_\_\_ excited

\_\_\_ ashamed

\_\_\_ upset

\_\_\_ inspired

\_\_\_ strong

\_\_\_ nervous

\_\_\_ guilty

\_\_\_ determined

\_\_\_ scared

\_\_\_ attentive

\_\_\_ hostile

\_\_\_ jittery

\_\_\_ enthusiastic

\_\_\_ active

\_\_\_ proud

\_\_\_ afraid

## **Healthy Food List**

# HEALTHY FOOD ITEMS

---

### **Fresh Vegetables:**

Lettuce; Other Greens; Cucumbers; Carrots; Asparagus; Zucchini; Radishes; Tomatoes; Green Beans; Onions; Green Onions; Peppers; Cauliflower; Broccoli; Peas; Celery; Potatoes; Corn; Sweet Potatoes; Squash

### **Fresh Fruits:**

Bananas; Apples; Oranges; Pears; Peaches; Nectarines; Grapefruit; Berries; Melon; Cherries

### **Frozen Foods:**

Green Beans; Peas; Mixed Vegetables; Carrots; Chicken Breasts; Fruit; Juice Bars; Blueberries; Corn; Fish; Fillets; Onions; Vegetarian-Burgers; Shrimp

### **Canned Foods:**

Black Beans; Kidney Beans; Tomatoes; Marinara Sauce; Tuna; Salmon; Pinto Beans; White Beans; Pineapples

### **Meats:**

Lean Hamburger; Pork Chops; Steaks; Fish; Shell Fish; Chicken; Turkey; Ham; Ground Turkey

### **Grains and Cereals:**

Whole Grain Bread; Whole Grain Pasta; Whole Grain Cereal; Oatmeal; Brown Rice; Quinoa

### **Beverages:**

Water; 100% Fruit Juice; Sparkling Water; Tomato Juice; Herbal Tea

**Dairy and Eggs:**

Low Fat Sour Cream; Low Fat Milk; Cheddar Cheese; Butter; Low Fat Cream Cheese; Colby Cheese; Mozzarella Cheese; Yogurt; Greek Yogurt

**Miscellaneous Items:**

Herbs and Spices; Sesame Oil; Low Fat Dressings; Mustard; Low Fat Mayonnaise; Honey; Low Sodium Soy Sauce; Walnuts; Pumpkin Seeds; Mixed Nuts; Almonds; Pecans; Flax Seeds; Olive Oil; Walnut Oil; Garlic



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